

WHAT IS CLAIMED IS:

1. A power supply apparatus for an electric vehicle which includes a vehicle power supply for driving an electric motor and other vehicle equipment comprising:  
intermediate voltage application means for setting a line defined by an intermediate voltage between a drive voltage and a ground voltage of said vehicle power supply as a ground line for said other vehicle equipment, and  
power supply means for producing a voltage to be applied to said other vehicle equipment based on the drive voltage of said vehicle power supply and the intermediate voltage.
2. The power supply apparatus for an electric vehicle according to claim 1, wherein said power supply means produces a pulse voltage which varies high and low around the intermediate voltage.
3. The power supply apparatus for an electric vehicle according to claim 2, wherein said power supply means varies the duty ratio of the pulse voltage to adjust the voltage to be applied to said other vehicle equipment.

4. The power supply apparatus for an electric vehicle according to claim 1, wherein the intermediate voltage application means includes a node disposed between two batteries for providing the vehicle power supply.

5. The power supply apparatus for an electric vehicle according to claim 1, wherein the power supply means is an inverter for selectively supplying a predetermined intermediate voltage to said other vehicle equipment.

6. The power supply apparatus for an electric vehicle according to claim 5, wherein said inverter supplies plus or minus 24 V.

7. The power supply apparatus for an electric vehicle according to claim 5, wherein said inverter supplies plus or minus 12 V.

8. The power supply apparatus for an electric vehicle according to claim 1, wherein said power supply means includes a power supply circuit operatively connected to an oscillator, a photo-coupler including a photo-diode and a phototransistor, FETs Q1 and Q2, diodes, a capacitor and resistors for producing the voltage to be applied to the other vehicle equipment.

9. The power supply apparatus for an electric vehicle according to claim 8, wherein when the FET Q1 is turned on with a predetermined level, the capacitor is charged.

10. The power supply apparatus for an electric vehicle according to claim 9, wherein the FET Q1 is turned off, the photo-diode emits light and the photo-transistor is turned on for supplying current from the capacitor to the FET Q2.

11. A power supply apparatus adapted to be used with an electric vehicle adapted for receiving a vehicle power supply for driving an electric motor and other vehicle equipment comprising:

an intermediate voltage application device for providing an intermediate voltage between a drive voltage and a ground voltage of said vehicle power supply as a ground line adapted to be connected to said other vehicle equipment, and

power supply circuit for producing a voltage adapted to be applied to said other vehicle equipment based on the drive voltage of said vehicle power supply and the intermediate voltage.

12. The power supply apparatus adapted to be used with an electric vehicle according to claim 11, wherein said power supply circuit produces a pulse voltage which varies high and low around the intermediate voltage.

13. The power supply apparatus adapted to be used with an electric vehicle according to claim 12, wherein said power supply circuit varies the duty ratio of the pulse voltage to adjust the voltage to be applied to said other vehicle equipment.

14. The power supply apparatus adapted to be used with an electric vehicle according to claim 11, wherein the intermediate voltage application device includes a node disposed between two batteries for providing the vehicle power supply.

15. The power supply apparatus adapted to be used with an electric vehicle according to claim 11, wherein the power supply circuit is an inverter for selectively supplying a predetermined intermediate voltage to said other vehicle equipment.

16. The power supply apparatus adapted to be used with an electric vehicle according to claim 15, wherein said inverter supplies plus or minus 24 V.

17. The power supply apparatus adapted to be used with an electric vehicle according to claim 15, wherein said inverter supplies plus or minus 12 V.

18. The power supply apparatus adapted to be used with an electric vehicle according to claim 11, wherein said power supply circuit is operatively connected to an oscillator, a photo-coupler including a photo-diode and a photo-transistor, FETs Q1 and Q2, diodes, a capacitor and resistors for producing the voltage to be applied to the other vehicle equipment.

19. The power supply apparatus adapted to be used with an electric vehicle according to claim 18, wherein when the FET Q1 is turned on with a predetermined level of current the capacitor is charged.

20. The power supply apparatus adapted to be used with an electric vehicle according to claim 19, wherein the FET Q1 is turned off, the photo-diode emits light and the photo-transistor is turned on for supplying current from the capacitor to the FET Q2.